

*Notices of New Fresh-water Infusoria.* By Alfred C. Stokes, M.D., Trenton, N. J.

(Read before the American Philosophical Society, September 16th, 1887.)

*Hexamita spiralis*, sp. nov. Fig. 1.

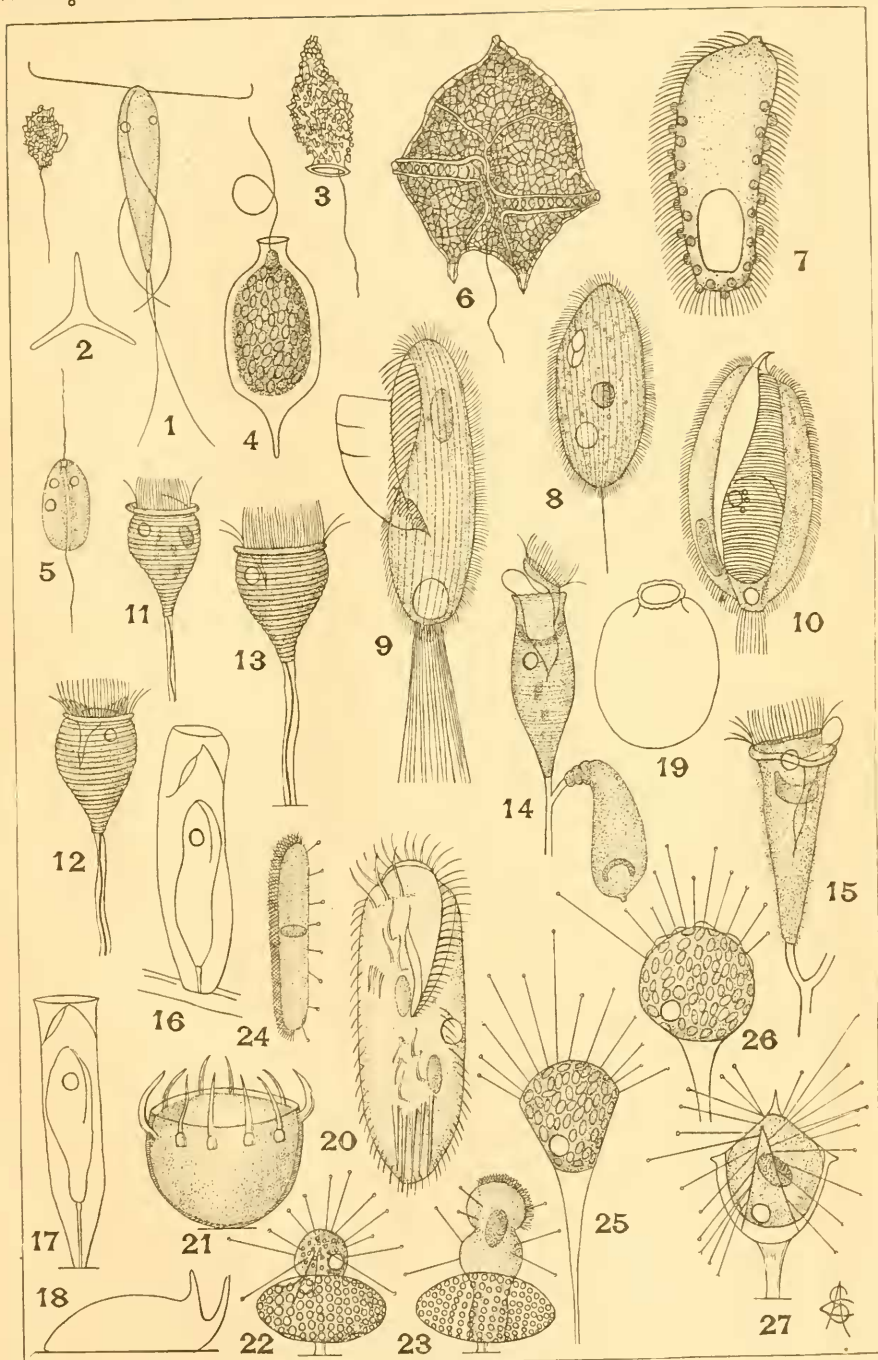
Body elongate obovate, about four times as long as broad, the anterior extremity rounded, the posterior obtusely pointed; anterior flagella four in number, vibratile, arising close together, their length diverse but exceeding that of the body, the two shortest extended opposite each other at right angles to the body, their distal extremities curved forward; the remaining two extending backward, each forming a long, loose spiral; trailing flagella two, arising from the tip of the posterior extremity, and exceeding the body in length; contractile vesicles two, situated opposite each other in the anterior body-half; nucleus obscure. Length of body,  $\frac{1}{2}\frac{1}{50}$  inch. *Hab.*—The intestinal canal of the tadpole of the common toad. Movements by rapid rotation on the longitudinal axis.

This differs from previously observed species in the presence of two contractile vesicles, and in the spiral disposition of two of the anterior flagella.

*Petalomonas dorsalis*, sp. nov. Fig. 2; diagram.

Body broadly ovate or suborbicular, colorless, transparent, the length but slightly exceeding the breadth; the anterior extremity the narrower, evenly or obliquely rounded, occasionally obliquely truncate; posterior border rounded, sometimes emarginate; dorsal surface longitudinally traversed by a central, strongly compressed keel-like and upright plane, or broad wing, the superior margin of which is evenly convex; ventral surface somewhat concave, a transverse optic section of the body presenting a triradiate appearance, the re-entering, dorso-lateral and ventral angles rounded; oral fossa conspicuous, from which apparently issues a flagellum subequal to the body in length; nucleus subcircular in outline, placed near the centre of the left-hand body margin; contractile vesicle single, small, located on the left-hand side of the dorsal ala near the body centre; endoplasm coarsely granular. Length of body,  $\frac{1}{6}\frac{1}{50}$  to  $\frac{1}{6}\frac{1}{00}$  inch. *Hab.*—Standing pond water.

This is readily recognizable from *P. carinata*, for which it might perhaps be mistaken, by its much larger size, and by the very conspicuously developed centro-dorsal, upright plane. In *P. carinata* the dorsal elevation is low and ridge-like, and although the lateral surfaces of this part are usually evenly sloping or slightly convex, they are at times noticeably concave. In *P. dorsalis* the dorsal ala is usually as high as one-half the width of the body. The part seems especially liable to deformity, often being observed to be variously indented, or distorted and developed to one side or the other of its normal central position.





*Petalomonas sulcata*, sp. nov.

Body ovate, colorless, transparent, depressed, less than twice as long as broad, the surface traversed longitudinally, sometimes in a slightly oblique direction, by from eight to ten keel-like ridges, the intervening spaces being concave; anterior extremity narrowly rounded; the posterior truncate, with one, sometimes two, subcentral acuminations apparently formed by the terminal union of the longitudinal carinations; flagellum subequal to the body in length; nucleus and single contractile vesicle on opposite sides of the anterior body-half; endoplasm granular posteriorly. Length of body,  $\frac{1}{750}$  inch. *Hab.*—Pond water. Movements not rapid, the oral aperture usually in contact with the submerged object, the flagellum directed in advance, the anterior extremity alone vibrating.

*Urceolopsis* (*Urceolus*;  $\alpha\psi\iota\varsigma$ ), gen. nov.

Animalcules free-swimming, flask-shaped, soft, flexible and elastic, the entire cuticular surface more or less covered by adherent, irregular and angular sand grains; otherwise essentially as in *Urceolus*.

*Urceolopsis sabulosa*, sp. nov. Fig. 3.

*Urceolus sabulosus*, Stokes; Am. Monthly Micr. Journ., vii, May, 1886.

Body flask-shaped, soft, flexible, elastic, normally compressed and somewhat gibbous, about twice as long as broad, widest centrally, obtusely pointed posteriorly, the entire surface more or less covered, often almost concealed, by adherent, irregular and angular sand grains; anterior extremity constricted to form a short neck-like prolongation, the circular border thickened, expanded, and obliquely truncate; flagellum large, equaling or exceeding the body in length; nucleus not observed; contractile vesicle (?) single, laterally placed near the anterior extremity; pharynx apparently extending to near the body-centre. Length of body,  $\frac{1}{750}$  inch. *Hab.*—Fresh water with Algæ.

*Trachelomonas urceolata*, sp. nov. Fig. 4.

Lorica vasiform, about twice as long as broad, the lateral margins slightly flattened, anteriorly produced in a short, subcylindrical neck, the aperture slightly everted, truncate, not oblique; posterior extremity not inflated, produced in an acuminate, tail-like prolongation; endoplasm enclosing numerous, probably amylaceous, corpuscles. Length of lorica,  $\frac{1}{750}$  inch. *Hab.*—Pond water.

*Trachelomonas verrucosa*, sp. nov.

Lorica subspherical, colorless, the entire surface covered with minute, hemispherical elevations; anterior extremity slightly emarginate. Length and breadth,  $\frac{1}{700}$  inch. *Hab.*—Pond water, with Algæ.

*Trachelomonas acanthostoma*, sp. nov.

Lorica subspherical, brown, the anterior extremity bearing two more or less irregular rows of short, conical spines encircling the orifice, which is not produced, the remaining surface punctate; endoplasm apparently vacuolar. Length,  $\frac{1}{8\frac{3}{4}}$  inch. *Hab.*—Pond water.

*Anisonema solenota*, sp. nov. Fig. 5.

Body sub-elliptical, depressed, less than twice as long as broad, slightly narrowed at the anterior extremity; the posterior border rounded; the frontal margin slightly and narrowly truncate; ventral surface flat, the dorsal longitudinally traversed by a subcentral depression or groove; oral aperture distinct; flagella diverse in length, the vibratile appendage about as long as the body, the trailing twice that length; contractile vesicle double, situated opposite to each other in the anterior body-half, near the median groove; nucleus single, subspherical, subcentrally placed near the left-hand body-margin; endoplasm colorless, transparent. Length,  $\frac{1}{10\frac{0}{0}}$  inch. *Hab.*—Standing pond water.

*Protoperidinium limbatum*, sp. nov. Fig. 6.

Carapace rhomboidal, depressed, little longer than broad, the postero-lateral margins produced in two, short, acuminate, horn-like processes, the posterior border concave; ventral surface flattened, with a central, longitudinal depression; surface faceted and minutely reticulated, the margins of the carapace and of the equatorial groove having a narrow, colorless, projecting, flattened and reticulate border; flagellum of the lateral groove spiral. Length,  $\frac{1}{8\frac{0}{0}}$  inch. *Hab.*—Marsh water, with sphagnum; color, yellow.

*Holophrya ornata*, sp. nov. Fig. 7.

Body obovate, compressed, slightly curved toward one side, less than three times as long as broad, the anterior extremity rounded, the posterior truncate; cuticular surface not striate, entirely ciliate; the cilia long and fine; oral aperture eccentric, the borders slightly protruding; lateral margins and posterior extremity ornamented by two rows of cuticular, rounded elevations, the series beginning at the middle third of one lateral border, and continued through the middle third of the opposite region, the constituent elevations of one series being alternate with those of the other; contractile vesicle single, large, near the posterior extremity; nucleus obscure; endoplasm coarsely granular. Length, about  $\frac{1}{2\frac{5}{0}}$  inch. *Hab.*—Standing pond water. Movements rotatory on the longitudinal axis.

*Saprophilus* (σαπροφιλος), gen. nov.

Animalcules free-swimming, holotrichous, ovate, soft, flexible and changeable in shape; general cuticular surface clothed with fine vibratile cilia, a single, long, flexible seta projecting from the posterior extremity; oral aperture ventral, supplemented by a vibratile and retractile hood-like membrane.

*Saprophilus agitatus*, sp. nov. Fig. 8.

Body ovate, compressed, about twice as long as broad, the posterior extremity rounded, the antero-ventral border obliquely truncate; cuticular surface longitudinally striate, the cilia short and fine; oral aperture ovate, ventral, at a short distance from the anterior extremity; the hood-like membrane narrow, widest posteriorly, narrowing to its anterior termination; contractile vesicle single, in the posterior body-half; nucleus subspherical, subcentrally placed. Length of body,  $\frac{1}{750}$  to  $\frac{1}{560}$  inch. *Hab.*—An infusion containing much decaying animal matter. Reproduction by transverse fission.

The hood-like velum resembles in character and function the oral appendage of *Pleuronema*, widely differing, however, in its vibratile movements, *Pleuronema* having only the power to lower and raise the organ, while the present form possesses the additional ability to rapidly vibrate the appendage. When retracted the latter is, similarly with the hood in *Pleuronema*, folded and stowed away about the posterior and lateral margins of the mouth.

The body is extremely soft, and quite changeable in shape, the latter, however, usually consisting chiefly in the assumption of a subspherical form. It has the power to force itself through small orifices, the body-sarcode flowing almost as freely as a semi-fluid substance.

These animalcules are essentially scavengers, greedily appropriating decaying animal fragments, swarming in crowds around and within the dead bodies of various small aquatic animals. Within the body of a dead *Gammarus* they were crowded in profusion, there rapidly undergoing reproductive fission, the process being probably hastened by the abundance of stimulating food.

*Bothrostoma* (βοθροσ; στομα), gen. nov.

Animalcules free-swimming, heterotrichous, ovate, soft and flexible; peristome-field a more or less obliquely directed longitudinal depression, situated on the left-hand side of the body, extending beyond the body-centre, and continued inward as a short, ciliated, pharyngeal passage; the left-hand border of the peristome bearing a series of large cilia, the posterior portion of the right-hand margin supporting an undulating membrane; a cluster of long setose cilia projecting from the posterior extremity; contractile vesicle and nucleus conspicuous; anal aperture postero-terminal. Inhabiting fresh water.



*Bothrostoma undulans*, sp. nov. Fig. 9.

Body ovate, about two and one-half times as long as broad, colorless, soft and changeable in shape, the anterior extremity obtusely pointed, the posterior border truncate; cuticular surface longitudinally striate; peristome-field extending obliquely inwards beyond the body-centre; undulating membrane large, often resembling a long anteriorly curved seta, extending from the oral aperture to within one-third of the body-length of the anterior extremity; oral aperture at the posterior termination of the peristome, ovate; pharynx short, ciliate, infundibuliform; posterior setose cilia long and conspicuous; nucleus ovate, situated in the anterior body-half; contractile vesicle large, single, spherical, placed near the posterior extremity. Length of body,  $\frac{1}{20.5}$  inch. *Hab.*—Standing pond water.

*Hymenostoma magna*, sp. nov. Fig. 10.

Body ovate, depressed, about twice as long as broad, the dorsal surface convex, the ventral flattened and chiefly occupied by the wide, adoral depression or groove which extends from the frontal border almost to the posterior extremity, the latter slightly produced and truncate, a broad tuft of larger cilia fringing the truncation; anterior border narrow, obliquely rounded; left-hand margin of the peristome bearing a series of long, fine cilia, directed across the adoral depression, the left-hand border furnished with an undulating membrane, widest anteriorly and projecting beyond the frontal body-margin as a sinistrally directed, concave acumination; oral aperture near the posterior extremity of the peristome; nucleus ovate, slightly curved, located posteriorly on the right-hand side of the body; contractile vesicle double, one near the posterior extremity, the other near the right-hand side of the body-centre, and formed, after systole, by the coalescence of several small vacuoles; cuticular surface fine striate longitudinally. Length of body,  $\frac{1}{22.5}$  inch. *Hab.*—Standing pond water. Movement a rapid often backward revolution on the longitudinal axis.

This, the second known member of the genus, is readily distinguishable from *H. hymenophora* by the larger body, it being about twice as large as the last mentioned species, by the posterior truncation with its ciliary fringe, and by the form of the peristomal membrane, with its anterior projecting acumination. As in *H. hymenophora* the food masses collect in the left-hand side of the body.

Conjugation has been observed, union taking place between the ventral surfaces of the right-hand body-margins.

*Vorticella pusilla*, sp. nov. Fig. 11.

Body conical-campanulate, less than twice as long as broad, widest anteriorly, tapering thence to the pedicle; constricted immediately beneath the peristome; cuticular surface transversely striate; peristome equaling

the body-centre in width, the border thickened; pedicle from five to six times as long as the body; nucleus apparently ovate, anteriorly placed; contracted body subspherical, invaginating the extremity of the pedicle. Length of extended body,  $\frac{1}{1300}$  inch. *Hab.*—Pond water; attached to rootlets of *Lemna*. Solitary.

*Vorticella mollis*, sp. nov.

Body conical campanulate, somewhat changeable in shape, widest anteriorly, tapering posteriorly, the length scarcely exceeding the width; peristome broad, flattened, crateriform, equaling in width the body-length, the border not revolute; cuticular surface very minutely tuberculate; contractile vesicle double; pedicle from sixteen to eighteen times as long as the body; contracted body subspherical. Length of the extended zooid,  $\frac{1}{600}$  inch. *Hab.*—Pond water; attached to rootlets of *Lemna*. Solitary.

*Vorticella aqua-dulcis*, sp. nov. Fig. 12.

Body ovate or pyriform, very slightly changeable in shape, less than twice as long as broad, slightly constricted beneath the peristome border, the cuticular surface strongly and conspicuously striate transversely; peristome more than one-half the body-centre in breadth, but not equaling it, the border thickened, not everted; ciliary disc obliquely elevated; pedicle from two to three times as long as the body. Length of body,  $\frac{1}{350}$  inch. *Hab.*—Fresh water; attached to rootlets of *Lemna*. Solitary, or few together. Contracted body obovate.

*Vorticella platysoma*, sp. nov. Fig. 13.

Body ovate or pyriform, less than twice as long as broad, the anterior body region subspherical, the posterior tapering to the pedicle; cuticular surface transversely striate; peristome equaling the body-centre in width, the border revolute; the ciliary disc not elevated; nucleus band-like, curved, transversely placed in the anterior body-half; pedicle seldom exceeding the body in length. Length of body,  $\frac{1}{1125}$  inch. *Hab.*—Pond water; attached to Algæ.

*Opercularia allensi*, sp. nov. Fig. 14.

Bodies elongate-fusiform or subvasiform, more than three times as long as broad, widest centrally, tapering posteriorly to the pedicle, constricted beneath the peristome, the cuticular surface very finely striate transversely; peristome border everted, minutely crenulate; ciliary disc very obliquely exerted; ciliary circles two; membranous collar large and conspicuous; nucleus band-like, short, curved, transversely placed in the anterior body-half; contracted zooid suddenly pendent, obovate, usually



with two or more posterior annulations, and always exhibiting at the anterior border a short, but conspicuous snout-like prolongation; pedicle profusely and dichotomously branching, longitudinally striate, annulate irregularly and at wide intervals, the ultimate divisions very short. Length of body,  $\frac{1}{250}$  inch; height of entire colony,  $\frac{1}{50}$  inch. *Hab.*—Pond water; attached to Algæ and various aquatic plants.

At first glance this closely resembles *O. nutans* (Ehr.) Stein, great differences being discernible, however, on slight examination. In *O. nutans* the pedicle is strongly and conspicuously annulate; here the annulations are absent or few in number and irregularly placed. The zooids are here transversely striate, while in *O. nutans* they are presumably smooth. In size the two forms are also widely and distinctly different, the bodies of *O. nutans* measuring only  $\frac{1}{430}$  inch in length, while in *O. allensi* they are almost twice as large; the height of the entire colony of the former is from  $\frac{1}{24}$  to  $\frac{1}{9}$  inch, an enormous altitude in comparison with the  $\frac{1}{50}$  inch of *O. allensi*. In their contracted state their resemblance is very close.

*Opercularia vestita*, sp. nov. Fig. 15.

Bodies elongate-conical, soft, flexible and somewhat changeable in shape, less than three times as long as broad, tapering from the region beneath the peristome to the pedicle; cuticular surface, with the exception of the peristome border and ciliary disc, entirely clothed with a coarsely granular, mucilaginous investment; peristome exceeding the body-centre in width, the border slightly revolute; ciliary disc conspicuously exerted, and obliquely elevated; ciliary circles three; vestibular seta conspicuous; contractile vesicle single, spherical, anteriorly placed, apparently within the base of the ciliary disc; nucleus band-like, broad, short and curved; endoplasm granular; contracted body obovate, with several posteriorly developed annulations, and an anterior, snout-like projection; pedicle tree-like, profusely and dichotomously branching, longitudinally striate, becoming chestnut-brown with age; primary pedicle seldom exceeding in height twice the length of a single body, the ultimate branches about one-fifth as long as the zooids, often curved, a single animalcule being stationed on the extremity of each ultimate division. Length of body,  $\frac{1}{300}$  inch; height of the entire foot-stalk, exclusive of the zooids,  $\frac{1}{40}$  inch. *Hab.*—Pond water; attached to aquatic plants.

*Thuricolopsis* (*Thuricola*; οφίς), gen. nov.

Animalcules loricate, the loricae as in *Thuricola*, with the addition of an internal, narrow, flexible valve-rest, adherent to the lorica wall by one extremity, and projecting arcuately across the cavity to receive and support the descended valve; zooid posteriorly attached to the lorica by a distinctly developed pedicle; otherwise essentially as in *Thuricola*.

*Thuricolopsis innixa*. Fig. 16.*Thuricola innixa* Stokes. Am. Monthly Micros. Journ., Oct., 1882.

Lorica subcylindrical, sessile, from four to five times as long as broad, somewhat attenuate posteriorly, the base of attachment truncate; the frontal border even, sometimes slightly everted; bearing internally, at some distance from the orifice, a valve-like appendage as in *Thuricola valvata*, and an opposite, rigidly attached but distally flexible membranous, setiform organ projecting arcuately inwards, and acting as a support to the descended valve, the wall of the lorica being inflated immediately behind this bristle-like valve-rest; enclosed animalcule pedicellate, projecting, when extended, one-third of its entire length beyond the lorica aperture. Length of lorica,  $\frac{1}{150}$  inch. *Hab.*—Pond water; attached to various aquatic plants.

*Thuricolopsis Kellicottiana*, sp. nov. Fig. 17.

Lorica subcylindrical, sessile, less than four times as long as broad, the posterior region tapering, attenuate, subcylindrical and forming about one-eighth of the entire length; frontal border slightly everted; posterior extremity truncate; valve and bristle-like support essentially as in *Th. innixa*, the lorica wall not inflated behind the valve-rest; enclosed animalcule, when extended, long and attenuate, about one-fourth of its length projecting beyond the lorica aperture; pedicle filiform, from one-sixth to one-seventh as long as the lorica; cuticular surface smooth; two zooids frequently occupying the same sheath; nucleus extremely long, narrow and undulate; endoplasm granular; contracted body elongate obovate. Length of lorica,  $\frac{1}{118}$  inch. *Hab.*—Pond water; attached to various aquatic plants.

This form was first observed by Prof. D. S. Kellicott attached to aquatic plants, at Corunna, Mich. (*Proc. Amer. Soc. Micros.*, 1884), and by him referred to as a variety of *Th. innixa*. It occurs sparingly in the writer's locality in New Jersey, and seems sufficiently distinct to merit a specific title and place.

*Platycola calochila*, sp. nov. Fig. 18.

Lorica broadly ovate, becoming brown with age, less than three times as long as broad, dorsal surface convex; posterior extremity rounded, the anterior obliquely rounded or truncate, produced as a very short, vertical, neck-like prolongation, the margins slightly everted, the aperture transversely oval or subelliptical, laterally prolonged toward the ventral aspect, presenting, in lateral view, the appearance of a deep, rounded excavation; zooid, when extended, protruding for a considerable distance beyond the aperture; nucleus long, narrow, band-like. Length of lorica,  $\frac{1}{15}$  inch. *Hab.*—Pond water; attached to the rootlets of *Lemna*.

*Lagenophrys patina*, sp. nov. Fig. 19.

Lorica nearly orbicular, much depressed, upper surface slightly convex, the lower plane; aperture circular, terminating a short, nearly perpendicular neck-like prolongation, surrounded by a thin, apparently membranous, horizontally projecting border, its margin irregularly and minutely crenulate. Diameter of lorica,  $\frac{1}{450}$  to  $\frac{1}{500}$  inch. *Hab.*—Pond water; attached to the legs and branchial appendages of *Gammarus*.

In form and size this closely resembles *L. ampulla* Stein, but differs in the absence of the everted and beaded rim projecting in front of the oral aperture in the first-mentioned species.

*Histrio ercthesticus*, sp. nov. Fig. 20.

Body subelliptical, less than three times as long as broad, both extremities rounded, the lateral borders flattened, nearly parallel; lip semicircular; peristome-field reaching to the centre of the ventral surface, the right-hand margin bearing a membrane; frontal styles nine, the three anterior ones largest, the three posterior smallest, setose, inconspicuous; ventral styles five, more or less clustered, two on the right-hand side small, setose; anal styles large, stout, usually rigid, only the second and third on the right-hand side projecting beyond the posterior border; marginal setae uninterrupted. Length of body,  $\frac{1}{170}$  inch. *Hab.*—Shallow pools, with *Lemna* and Algæ.

The animalcule's movements during forward progression are constant but not especially rapid, nor long extended in one direction, but it has a most annoying habit of suddenly darting backward, for a distance seldom exceeding its own length, yet as it is impossible to anticipate the direction of this erratic movement, and as the change of position is extremely rapid, the eye fails to adjust itself soon enough to keep the creature distinctly visible. The Infusorian continues these backward leaps incessantly when not swimming forward, consequently it is a difficult animalcule to study. Occasionally, especially after long confinement, two contractile vesicles become apparent, a small vacuole developing near the centre of the left-hand margin of the peristome, in advance of the large normal vesicle.

*Solenophrya odontophora*, sp. nov. Fig. 21.

Lorica cup- or bowl-shaped, membranous, hyaline, the height about equal to the breadth, the posterior extremity rounded, the anterior border beneath the even, circular margin bearing from four to twelve attenuate, hollow, variously and inwardly curved, tooth-like processes; enclosed animalcule not adherent to the lorica; endoplasm finely granular. Height of the lorica including the processes,  $\frac{1}{125}$  inch; length of the tooth-like processes,  $\frac{1}{2250}$  inch. *Hab.*—Pond water; attached to *Myriophyllum*.

This form was first observed, and in considerable abundance, about four years ago, but has not since been met with. All the individuals then

noted had withdrawn the tentacles, and had become encysted within the lorica. The tentacles have therefore never been seen. These encysted forms were undergoing one stage of reproduction. The entire endoplasm is subdivided into very minute, remarkably active, biflagellate germs.

*Acineta bifaria*, sp. nov. Figs. 22, 23, 24.

Lorica, in side view, oval, the longest diameter less than twice the height; seen from above orbicular; the entire surface minutely tuberculate; pedicle very short, often only a small, inconspicuous, button-like projection; enclosed body attached to the posterior extremity only of the lorica, and divided into two unequal parts, the posterior region often entirely filling the cavity of the sheath, occasionally only about one-half filling it, the anterior portion subspherical, habitually extruded beyond the lorica aperture, and bearing the scattered capitate tentacles, the posterior or loricate portion often coarsely and longitudinally striate; endoplasm granular; contractile vesicles two, spherical, one situated near the lateral border of the anterior body-half, the other on the opposite side of the posterior or loricated region; nucleus apparently broadly ovate or subspherical, anteriorly placed; reproduction by transverse fission of the extruded anterior region, the embryo hypotrichous. Diameter of the lorica,  $\frac{1}{300}$  inch. *Hab.*—An infusion of hay.

The first noticeable sign of approaching reproductive fission consists in an increased extrusion of the body substance, speedily followed by the formation of fine cilia on the anterior surface, with the appearance of a transverse constriction subcentrally situated on the extruded portion, as in Fig. 23. This constriction deepens, the cilia increase in length, soon entirely clothing the frontal region and one lateral margin, and, by the time the division is completed, the posterior border as well. At the final separation of the embryo it is ovate, coarsely granular, with a somewhat conspicuous nucleus. It speedily becomes elongated and flattened, as in Fig. 24, its length exceeding the height of the mature animalcule. The cilia are confined to the extremities and the lower surface, while a few short, capitate tentacles are scattered over the superior aspect. After the departure of the embryo the remaining portion of the mature animalcule withdraws itself into the lorica, as in Fig. 22, the anterior, subspherical region remaining exposed and the tentacles protruded. The latter become fewer in number, but are not entirely withdrawn during the reproductive act. After it they become more numerous.

The presence of the short, button-like pedicle of some individuals gives the lorica an appearance closely resembling that of *Solenophrya*, to which genus they might readily be relegated if not seen scattered among the more abundant and more distinctly pedicellate forms.

*Acineta macrocaulis*, sp. nov. Figs. 25, 26.

Lorica obovate or subspherical. Lorica obovate, the length only slightly exceeding the width, flexible, continuous, taking the form of the enclosed